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NEW UNITED STATES UTILITY PATENT APPLICATION

under 37 C.F.R. 1.53(b)

Atty. Docket No. 03797.78802

Assistant Commissioner of Patents
Box Patent Applications
Washington, D.C. 20231

Enclosed herewith is a new patent application and the following papers:

First Named Inventor (or application identifier): Susan D. Woolf, et al.

Title of Invention: **SYSTEM AND METHOD FOR ANNOTATING AN ELECTRONIC DOCUMENT INDEPENDENTLY OF ITS CONTENT**

1. ■ Specification 16 pages (including specification, claims, abstract) / 20 claims (3 independent)

2. ■ Declaration/Power of Attorney is:
   - ■ attached in the regular manner.
   - ☐ NOT included, but deferred under 37 C.F.R. § 1.53(f).

3. ■ 10 Distinct sheets of ■ Formal ☐ Informal Drawings

4. ☐ Preliminary Amendment.

5. ☐ Information Disclosure Statement
   - ☐ Form 1449
   - ☐ A copy of each cited prior art reference

6. ■ Assignment with Cover Sheet.

7. ☐ Priority is hereby claimed under 35 U.S.C. § 119(e) based upon the following application(s):

Country	Application Number	Date of Filing (day, month, year)

8. ☐ Priority document(s).

9. ☐ Statement Claiming Small Entity Status.

10. ☐ Microfiche Computer Program (Appendix).

11. ☐ Nucleotide and/or Amino Acid Sequence Submission.
   - ☐ Computer Readable Copy.
   - ☐ Paper Copy (identical to computer copy).
   - ☐ Statement verifying identity of above copies.

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12. Calculation of Fees:

FEES FOR	EXCESS CLAIMS	FEE	AMOUNT DUE
Basic Filing Fee (37 C.F.R. § 1.16(a))			$760.00
Total Claims in Excess of 20 (37 C.F.R. § 1.16(c))	0	18.00	$0.00
Independent Claims in Excess of 3 (37 C.F.R. § 1.16(b))	0	78.00	$0.00
Multiple Dependent Claims (37 C.F.R. § 1.16(d))	0	260.00	$0.00
Subtotal - Filing Fee Due			$760.00
	REDUCE BY (%)	($)	
Reduction by 50%, if Small Entity (37 C.F.R. §§ 1.9, 1.27, 1.28)	0		$0.00
TOTAL FILING FEE DUE			$760.00
Assignment Recordation Fee (if applicable) (37 C.F.R. § 1.21(h))	1	40.00	$40.00
GRAND TOTAL DUE			**$800.00**

13. PAYMENT is:

■ included in the amount of the GRAND TOTAL by our enclosed check. A general authorization under 37 C.F.R. § 1.25(b), second sentence, is hereby given to credit or debit our Deposit Account No. 19-0733 for the instant filing and for any other fees during the pendency of this application under 37 C.F.R. §§ 1.16, 1.17 and 1.18.

☐ not included, but deferred under 37 C.F.R. § 1.53(f).

14. All correspondence for the attached application should be directed to:

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SYSTEM AND METHOD FOR ANNOTATING AN ELECTRONIC DOCUMENT INDEPENDENTLY OF ITS CONTENT

Inventors: Andrew Baird, Susan Woolf, Darryl Rubin, John Beezer, and Sheng Jiang

TECHNICAL FIELD

This invention relates generally to document browsers and pages that are displayed using such browsers. More particularly, the invention provides a method and apparatus for allowing a user to add annotations and other markings to an electronic document independently of the content of the document.

BACKGROUND OF THE INVENTION

Web browsers are conventionally used to display documents created with a standard descriptive language such as Hyper Text Markup Language (HTML). Documents written in such languages can be displayed with various visual and audio effects such as color, animation, sound effects, and the like. The documents may include text, bitmap images, graphics, and other types of content.

Web browsers (or, more generally, "document browsers") typically provide functions which permit a user to advance forward and backward among a series of related pages; to jump to a specified page; to jump to pages that are referenced via a so-called "hyperlink" embedded in a page; and to maintain a list of recently viewed pages. Although frequently used to navigate through web pages on the Internet, document browsers can be used to display pages that reside on a local area network or even a local computer on which the browser executes.

Recently, as computers have become smaller, it has become possible to run browsers on notebook computers, palm-sized computers, and so-called "tablet and stylus" computers. The latter devices typically comprise a thin computer roughly the size of a sheet of paper with a large writing surface that doubles as a display, and a stylus that substitutes for a keyboard. A user can display and edit documents using the stylus as a writing instrument.

One potential application for such hand-held computers is the display of mass-produced documents such as books, maps, and other descriptive material. For example, a user who purchases a textbook or fictional work on a CD-ROM or other medium can display the work using a small computer such as a tablet-based computer.

In some instances, a user may want to annotate or otherwise mark pages displayed on the computer. Using a conventional word processing program, a user can rearrange text, highlight certain words or phrases, or delete portions of the text. Such features require that the user have access to the underlying content (e.g., the descriptive material that forms the work). In the case of copyrighted materials, however, editing capabilities may not be available to modify the underlying materials. Certain text may be copy-protected or otherwise unavailable for editing using normal editing tools, or may not be in a format suitable for word processing. In such circumstances, there may be no practical way for a user to annotate such works. As one example, a student viewing a copy-or edit-protected textbook on a tablet-based computer may have no practical way of making notes directly in the textbook. Such a feature would be desirable notwithstanding the copy protection or unavailability of general editing functions for the document.

SUMMARY OF THE INVENTION

The present invention provides a method and apparatus for users to annotate documents in a document browser without changing the contents of the documents. According to one variation of the invention, a tablet and stylus-based computer is programmed with a document browser that permits a user to annotate documents that are viewed through the browser. The annotations are stored separately from the viewed document pages but are correlated with the pages such that when a previously annotated page is revisited, annotations relating to that page are retrieved and displayed on top of the page as an "ink" layer.

According to one variation of the invention, three different annotation modes are provided: ink, highlight, and erase. Each mode can be selected through a user interface supplied through the browser or through controls embedded in a document. The annotation functions can be implemented as an Active-X® control, as an Applet, or as dedicated code integrated into the browser. Other features and advantages of the invention will become apparent through the following description, the figures, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a conventional general-purpose computing environment that can be employed in various embodiments of the invention.

FIG. 2 shows a conventional tablet and stylus-based computer that can be used

according to one aspect of the invention.

FIG. 3 is a conceptual view showing an ink layer 302 arranged on top of an underlying document page 301. The ink layer may include opaque and translucent markings.

FIG. 4 shows a user interface on a computer screen including a menu 402 that permits a user to select from among a plurality of annotation modes on a displayed document.

FIG. 5 shows a user interface on a computer screen including an opaque annotation 501 and a highlighted annotation 502, both superimposed over a displayed document.

FIG. 6 shows a user interface on a computer screen including an opaque annotation 601 in a pre-erase state.

FIG. 7 shows a user interface on a computer screen including an opaque annotation 701 in a post-erase state, where the annotation has been partially erased.

FIG. 8 shows one possible software design for implementing various principles of the invention.

FIG. 9A shows a flowchart indicating various steps that can be executed to provide an annotation function according to certain inventive principles.

FIG. 9B shows a flowchart indicating how previously created annotations can be superimposed over a document page.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a schematic diagram of a conventional general-purpose digital computing environment that can be used to implement various aspects of the invention. Computer 100 includes a processing unit 110, a system memory 120, and a system bus 130 that couples various system components including the system memory to the processing unit 110. The system bus 130 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory includes read only memory (ROM) 140 and random access memory (RAM) 150.

A basic input/output system 160 (BIOS), containing the basic routines that help to transfer information between elements within the computer 100, such as during start-up, is stored in ROM 140. Computer 100 also includes a hard disk drive 170 for reading from and writing to a hard disk (not shown), a magnetic disk drive 180 for reading from or writing to

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a removable magnetic disk 190, and an optical disk drive 191 for reading from or writing to a removable optical disk 192 such as a CD ROM or other optical media. The hard disk drive 170, magnetic disk drive 180, and optical disk drive 191 are connected to the system bus 130 by a hard disk drive interface 192, a magnetic disk drive interface 193, and an optical disk drive interface 194, respectively. The drives and their associated computer-readable media provide nonvolatile storage of computer readable instructions, data structures, program modules and other data for the personal computer 100. It will be appreciated by those skilled in the art that other types of computer readable media which can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, random access memories (RAMs), read only memories (ROMs), and the like, may also be used in the exemplary operating environment.

A number of program modules can be stored on the hard disk, magnetic disk 190, optical disk 192, ROM 140 or RAM 150, including an operating system 195, one or more application programs 196, other program modules 197, and program data 198. A user can enter commands and information into the computer 100 through input devices such as a keyboard 101 and pointing device 102. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit 110 through a serial port interface 106 that is coupled to the system bus, but may be connected by other interfaces, such as a parallel port, game port or a universal serial bus (USB). A monitor 107 or other type of display device is also connected to the system bus 130 via an interface, such as a video adapter 108. In addition to the monitor, personal computers typically include other peripheral output devices (not shown), such as speakers and printers.

The computer 100 can operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 109. Remote computer 109 can be a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to computer 100, although only a memory storage device 111 has been illustrated in FIG. 1. The logical connections depicted in FIG. 1 include a local area network (LAN) 112 and a wide area network (WAN) 113. Such networking environments are commonplace in offices, enterprise-

wide computer networks, intranets and the Internet.

When used in a LAN networking environment, the computer 100 is connected to the local network 112 through a network interface or adapter 114. When used in a WAN networking environment, the personal computer 100 typically includes a modem 115 or other means for establishing a communications over the wide area network 113, such as the Internet. The modem 115, which may be internal or external, is connected to the system bus 130 via the serial port interface 106. In a networked environment, program modules depicted relative to the personal computer 100, or portions thereof, may be stored in the remote memory storage device.

It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers can be used. The existence of any of various well-known protocols such as TCP/IP, Ethernet, FTP, HTTP and the like is presumed, and the system can be operated in a client-server configuration to permit a user to retrieve web pages from a web-based server. Any of various conventional web browsers can be used to display and manipulate data on web pages.

FIG. 2 shows a tablet and stylus computer that can be used in accordance with various aspects of the present invention. Any or all of the features, subsystems, and functions in the system of FIG. 1 can be included in the computer of FIG. 2. Computer 201 includes a large display surface 202 (e.g., a flat panel display) on which a plurality of windows 203 is displayed. Using stylus 204, a user can select, highlight, and write on the display area. Computer 201 interprets marks made using stylus 204 in order to manipulate data, enter text, and execute conventional computer application tasks such as spreadsheets, word processing programs, and the like. One commercially available tablet and stylus computer incorporating many of these features is the Stylistic 2300 computer sold by Fujitsu Personal Systems, Inc., of Santa Clara, California.

A stylus could be equipped with buttons or other features to augment its selection capabilities. In one embodiment, a stylus could be implemented as a "pencil" or "pen" in which one end constitutes a writing portion and the other end constitutes an "eraser" end which, when moved across the display, indicates that portions of the display are to be erased. Other types of input devices such as a mouse, trackball, or the like could be used.

Additionally, a user's own finger could be used to select or indicate portions of the displayed image on a touch-sensitive or proximity-sensitive display. Consequently, the term "user input device" is intended to have a broad definition and encompasses many variations on well-known input devices.

FIG. 3 is a conceptual view showing a computer screen on which a document page 301 is displayed using a document browser. As is conventional, the document page contains text and/or graphics of interest to the user (i.e., "content"). In accordance with the invention, a special "ink" layer 302 is superimposed over the document page 301. Using stylus 305, the user can highlight certain parts of the document 304, which are then shown in a highlighted color (e.g., yellow) against the background text.

Also using stylus 305, the user can mark opaque annotations 303 on the computer display, which appear to be written on the page itself. (Although ink layer 302 is shown as a separate layer in FIG. 3, this view is for conceptual purposes only; the user would see only document page 301 with annotations superimposed over the text and/or graphics on the page). According to one aspect of the invention, annotations made by a user on document page 301 are maintained as a separate "ink" layer 302 that is superimposed over and blended with pixels on the document page. Consequently, even though the annotations appear to be made directly on the underlying document, they are actually maintained in a separate display layer blended with the document page being viewed.

In one embodiment, annotations are specific to each user, such that other users who view the same document will not see a previous user's annotations. This feature can be implemented using log-ins or other user identifiers. For an identical document retrieved at two different remote computers each having the inventive features, annotations made on one remote computer would not show up on the other remote computer, since the annotations are made independently of the document content. It is, however, within the scope of the invention to permit sharing of annotations if desired.

Although the inventive principles are described with respect to a tablet and stylus computer, these principles can be applied to other types of computers, including desktop systems, notebook computers, and the like. Many types of input devices, such as touch-sensitive displays and the like, can be used to indicate those portions of the display that are to

be annotated. Moreover, as explained above, many variations on a basic stylus are of course possible, including an embodiment in which the stylus includes a writing end and an "erasing" end.

FIG. 4 shows a user interface on a computer screen on which a document page 401 is displayed using a document browser. In accordance with one embodiment of the invention, the user interface includes an annotation mode selection menu 402 that permits a user to select from among a plurality of annotation modes for a displayed document. By tapping the stylus on pen button 403, the user can cause the annotation mode selection menu 402 to be displayed. A mode indicator 404 indicates the current annotation mode for the document browser.

According to one variation of the invention, these modes can include an "ink" mode, a "highlight" mode, and an "erase" mode. Additionally, a "selection" mode permits the user to switch to normal browser functions. As shown in FIG. 4, the user interface is already in "erase" mode (indicated by mode indicator 404), so that "erase" is not shown as one of the available modes in menu 402.

It is not necessary to provide an explicit "mode selection" feature as described above; instead, mode selection can be implicit in the manner by which the input device is used. As one example, a stylus could be used to provide an ink mode when the stylus is used as a writing implement; a highlighting mode when the stylus is held a certain way or when a button is pressed on the stylus; and an erase mode when an "erasing" end of the stylus is moved across portions of the display. As another example, one of the modes (e.g., the ink mode) could be established as a default mode when a user input device is manipulated, with other modes being selected based on additional user inputs or manipulations or even voice commands, for example. Many other variations are of course possible.

FIG. 5 shows a user interface on a computer screen including the document of FIG. 4. Using the "ink" mode, the user has annotated a portion of the document 501 with an opaque ink color (e.g., black or blue). The user has also highlighted a different portion of the document 502 using the "highlight" mode. The highlighted portion 502 appears in a translucent color (e.g., yellow) superimposed over the underlying document. Using the "ink" and "highlight" modes, the user is able to annotate pages viewed through the document browser as needed.

FIGS. 6 and 7 show one possible approach for implementing an "erase" mode. FIG. 6 shows a pre-erase screen in which the user has annotated a document page using an opaque ink color 601. FIG. 7 shows the same screen of FIG. 6 after the user has selected the "erase" mode and moved the stylus across a portion of the annotated region 601, leaving a partially erased annotation 701. Using the "erase" mode, the user can remove previous annotations from the computer screen. The width of the eraser function can be varied to suit various applications, or it can even be user-selectable.

FIG. 8 shows one possible software design for implementing various principles of the invention. As shown in FIG. 8, a document browser 801 permits a user to retrieve and view content in the form of documents from a document storage area 804. The documents can be stored locally on the user's computer (e.g., on CD-ROM disks and the like), or they can be stored remotely and retrieved across a network such as the Internet. Annotation editor 803 retrieves and stores annotations in "ink layers" stored in a storage device or area 805. As with document storage, ink layer storage area 805 can be local or remotely located.

Annotations retrieved from storage area 805 are provided to pixel blending function 802, which is indicated as a newly provided function within document browser 801. Alternatively, pixel blending function 802 can be provided separately (e.g., in the operating system, for example). In general, pixel blending function 802 blends pixels from a document page with corresponding pixels from an annotation or "ink" layer mapped to that document page, and generates a blended pixel image that is displayed as an annotated document page 806.

In one embodiment, each opaque annotation pixel replaces a corresponding pixel on a document page, whereas each translucent annotation pixel (e.g., highlighting) is blended with a corresponding pixel value on a document page to produce a different color from that in the original document. Pixel blending functions such as alpha blending are well known and no further elaboration of this feature is required.

Annotations can be saved as "strokes" in a data structure and stored locally in a file associated with the currently displayed page of the document. Each stroke can comprise a stroke type (e.g., annotate, highlight or erase), a stroke width, and a stroke color in addition to coordinates indicating the stroke trajectory. In various embodiments, annotation storage

occurs automatically, such that whenever the input device is released (or lifted), a new stroke is automatically stored.

Alternatively, it is of course possible to store annotations as a bitmap image having the same or similar dimensions as the presently displayed document page, such that the annotation image can be superimposed over the document page. Combinations of these approaches are of course possible. For example, opaque annotations could be stored in a data structure, while highlighting could be stored as a bitmap image.

According to one embodiment, document browser 801 generates a title change event to annotation editor 803 each time a different document page is selected through document browser 801. This permits annotation editor 803 to retrieve previously stored annotations for a page, and to create a new annotation file for a newly displayed page. Annotation editor 803 intercepts stylus movements from a stylus or other cursor movement device and provides them to document browser 801 after any annotation processing has been performed. In one embodiment, browser 801 can constantly generate "screen paint" commands that are intercepted so that a blended image is continuously generated.

Annotation editor 803 can be implemented as an Active-X® control element, as an Applet, or as other forms of software functions. Annotation editor 803 and any related functions can be embedded into a document viewed through browser 801, such that viewing the document provides the annotation functions.

FIG. 9A shows a flowchart indicating various steps that can be executed to provide an annotation function according to one embodiment. It will be appreciated that many different approaches for carrying out the inventive principles are possible, and the steps shown are intended to be exemplary only. For example, although the steps are illustrated as being performed sequentially, they can in fact be performed by different components at different times in an object-oriented system using event-driven processing techniques. The steps shown can be implemented in software that is stored on a storage medium such as a disk.

Beginning in step 901, a stylus "down" event is detected. As noted previously, any of various input devices such as a mouse with key clicks or others can be used. In step 902, a test is performed to determine whether the annotation mode has been enabled. (See FIG. 4). If the annotation mode is not presently active, then in step 903 processing returns to the browser

(i.e., the stylus movement command is passed through to document browser 801).

In step 904, after it has been determined that the annotation mode is active, the page identifier for the currently displayed page is retrieved. It is contemplated but not necessary that each document page have a unique identifier (e.g., a unique URL). In step 905, a test is performed to determine whether the currently displayed page has a previously existing "ink" or "annotation" file associated therewith. If such an ink file exists, it is retrieved from storage area 805 (see FIG. 8). If no such file exists, a new ink file is created in step 906, preferably using a name that readily corresponds to the displayed document page.

After an ink file has been retrieved or newly created, a test is performed in step 907 to determine whether the annotation mode is "ink" mode. If the current annotation mode is "ink" mode, then in step 911 opaque pixels are written into the ink file at the current stylus position. The number of pixels written can be varied depending on the width or "swath" to be used for the annotation. For a wide swath (e.g., a magic marker type of annotation), a plurality of pixels can be written surrounding the current stylus position. For a narrower swath (e.g., a pinpoint type of annotation), a smaller number of pixels (e.g., one pixel wide) can be written to the annotation file at the current stylus position. It is within the scope of the invention to permit the user to select or change the width of the annotation marks.

In step 914, a pixel blending operation is performed, such that the pixels in the ink file are blended with pixels from the document, which causes the document to be displayed with annotations. (As described above, opaque pixels may entirely replace those in the viewed document). In step 915, a test is performed to determine whether the stylus or other input device has been lifted or disengaged. If so, then in step 916 the ink layer is stored, and processing returns to the browser in step 917. Otherwise, annotations continue at step 902, and can be stored as part of the same stroke. If the user again presses the stylus or input device against the document, then annotations resume in step 901.

Returning to step 907, if the present mode is not "ink" mode, then a test is made in step 908 to determine whether highlight mode was selected. If highlight mode is active, then in step 912 translucent pixels are written at the current stylus position. For example, yellow, pink, or other translucent colors can be stored at the current stylus position. As before, the pixels are blended in step 914, changing the resulting pixels on output but nevertheless

permitting the user to see the original document pixels in a modified form. Processing continues as described previously.

In step 908, if highlight mode is not currently active, then in step 909 a test is performed to determine whether erase mode is active. If so, then in step 913 the pixels at the current stylus position are cleared or zeroed out. As with highlight mode, the width of the erasure can be preset to a swath wider than one pixel, and the width can be different than the highlight or annotation pixel width. As before, the remaining non-erased pixels are blended with the original document image in step 914 and processing continues until the ink layer is stored.

FIG. 9B shows a flowchart indicating how previously created annotations can be superimposed over a document page. In step 918, a title change event is detected in document browser 801, and is sent to annotation editor 803. In various embodiments, a title change event occurs whenever the presently viewed document page changes. This may occur when the user jumps to a new document page, or when the user moves forward or backward among a sequence of related document pages, such as might occur in a book or a set of related hyperlinks. Other types of events, such as a "status change" event, for example, can be used instead of a title change event.

In step 919, a test is performed to determine whether an ink layer already exists for the new document page. If no ink layer exists for the page, processing returns to the document browser and the page is displayed normally. If an ink layer exists for the page, then in step 920 the ink layer is retrieved. In step 921, the pixels from the retrieved ink layer are blended with the displayed page and the resulting image appears on the computer display. Thereafter, processing returns to the browser. A separate ink layer file can be created for each document page, or one ink file can be created for an entire document and indexed according to pages on which the annotations appear. Other approaches are of course possible.

Thus has been described a system, method, and apparatus for annotating electronic document pages using an annotation editor that stores annotations independently of the content of the underlying document. It will be appreciated that many modifications and variations of the invention are possible, and the scope of the invention is not limited by the specific examples and descriptions herein.

CLAIMS

We claim:

1. A computer-implemented method of annotating pages of an electronic document independently of the contents of the document, comprising the steps of:

(1) displaying a page of the electronic document on a computer display device using a document browser that permits a user to move forward and backward among a plurality of document pages;

(2) selecting an annotation mode that permits the user to annotate the currently displayed document page;

(3) annotating parts of the currently displayed page by moving a user input device to indicate where on the currently displayed document page the annotations should appear; and

(4) storing annotations made in step (3) in a data structure separate from the electronic document.

2. The computer-implemented method of claim 1, wherein step (3) comprises the step of using opaque markings that obscure portions of the currently displayed document page.

3. The computer-implemented method of claim 1, wherein step (3) comprises the step of using a translucent highlighting that does not completely obscure the annotated portions of the currently displayed document page.

4. The computer-implemented method of claim 3, wherein step (3) comprises the step of blending pixels from the currently displayed document with a translucent color to produce a translucent annotation.

5. The computer-implemented method of claim 1, wherein step (3) comprises the step of using an erase highlighting that erases previously annotated areas of the currently displayed document page.

6. The computer-implemented method of claim 1, wherein step (3) comprises the step of using a stylus with a tablet computer system.

7. The computer-implemented method of claim 1, wherein step (3) comprises the step of storing a separate stroke for each annotation, wherein each stroke corresponds to a

continuous set of movement when the user input device is activated.

8. The computer-implemented method of claim 1, further comprising the steps of:

(5) moving to a different document page;

(6) retrieving previously stored annotations associated with the different document page; and

(7) displaying the retrieved annotations on the computer display device superimposed over the different document page.

9. The computer-implemented method of claim 8, wherein step (6) comprises the step of detecting a title change event in the document browser and, in response thereto, locating an annotation file corresponding to the different document page.

10. A system for annotating electronic documents independently of the content of the documents comprising:

a computer display device;

a computer programmed with a document browser that permits a user to display an electronic document on the computer display device and to move forward and backward among a plurality of document pages;

a computer input device that permits the user to indicate portions of a currently displayed document page; and

computer software that permits the user to annotate parts of the currently displayed document page according to indicated portions of the currently displayed document, wherein the computer software displays the annotated parts of the currently displayed document page on the computer display device and stores annotations made by the user in a data structure separate from the currently displayed document page.

11. The system of claim 10, wherein the computer software displays and stores opaque annotations that obscure annotated portions of the currently displayed document page.

12. The system of claim 10, wherein the computer software displays and stores translucent highlight annotations that do not completely obscure annotated portions of the currently displayed document page.

13. The system of claim 10, wherein the computer software displays and stores

erased annotations that remove previously made annotations on the currently displayed document page.

14. The system of claim 10, wherein the computer display device comprises a flat panel display, and wherein the computer input device comprises a stylus.

15. The system of claim 10, wherein the computer software retrieves, upon detecting a title change event, previously stored annotations associated with a different document page and displays the previously stored annotations on the different document page.

16. A computer-readable storage medium comprising computer-executable instructions for performing steps comprising:

(1) displaying an electronic document page on a computer display device and permitting a user to move forward and backward among a plurality of document pages;

(2) annotating parts of a currently displayed page in accordance with movement of a user input device to indicate where on the currently displayed document page the annotations should appear; and

(3) storing annotations made in step (2) in a data structure separate from the electronic document.

17. The computer-readable storage medium of claim 16, wherein the computer-executable instructions for step (2) further comprise instructions for creating an opaque annotation that obscures annotated portions of the currently displayed document.

18. The computer-readable storage medium of claim 16, wherein the computer-executable instructions for step (2) further comprise instructions for creating a translucent annotation that does not completely obscure annotations portions of the currently displayed document, wherein the translucent annotation is generated by blending pixels from the currently displayed document with a highlighting pixel color.

19. The computer-readable storage medium of claim 16, wherein the computer-executable instructions for step (2) further comprise instructions for erasing portions of previously created annotations.

20. The computer-readable storage medium of claim 16, wherein the computer-readable instructions further include steps for:

(4) in response to detecting that the user has moved to a different document page, retrieving previously stored annotations associated with the different document page; and

(5) displaying the annotations retrieved in step (4) on the different document page.

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ABSTRACT OF THE INVENTION

A system, method, and apparatus for annotating an electronic document independently of its content is provided. According to one variation, a tablet and stylus-based computer is programmed with a document browser that permits a user to annotate documents viewed through the browser. The annotations are stored separately from the viewed document pages but are correlated with the pages such that when a previously annotated page is revisited, annotations relating to that page are retrieved and displayed on top of the page as an "ink" layer. Three different annotation modes are possible: ink, highlight, and erase. Each mode can be selected through a user interface supplied through the browser or through controls embedded in a document.

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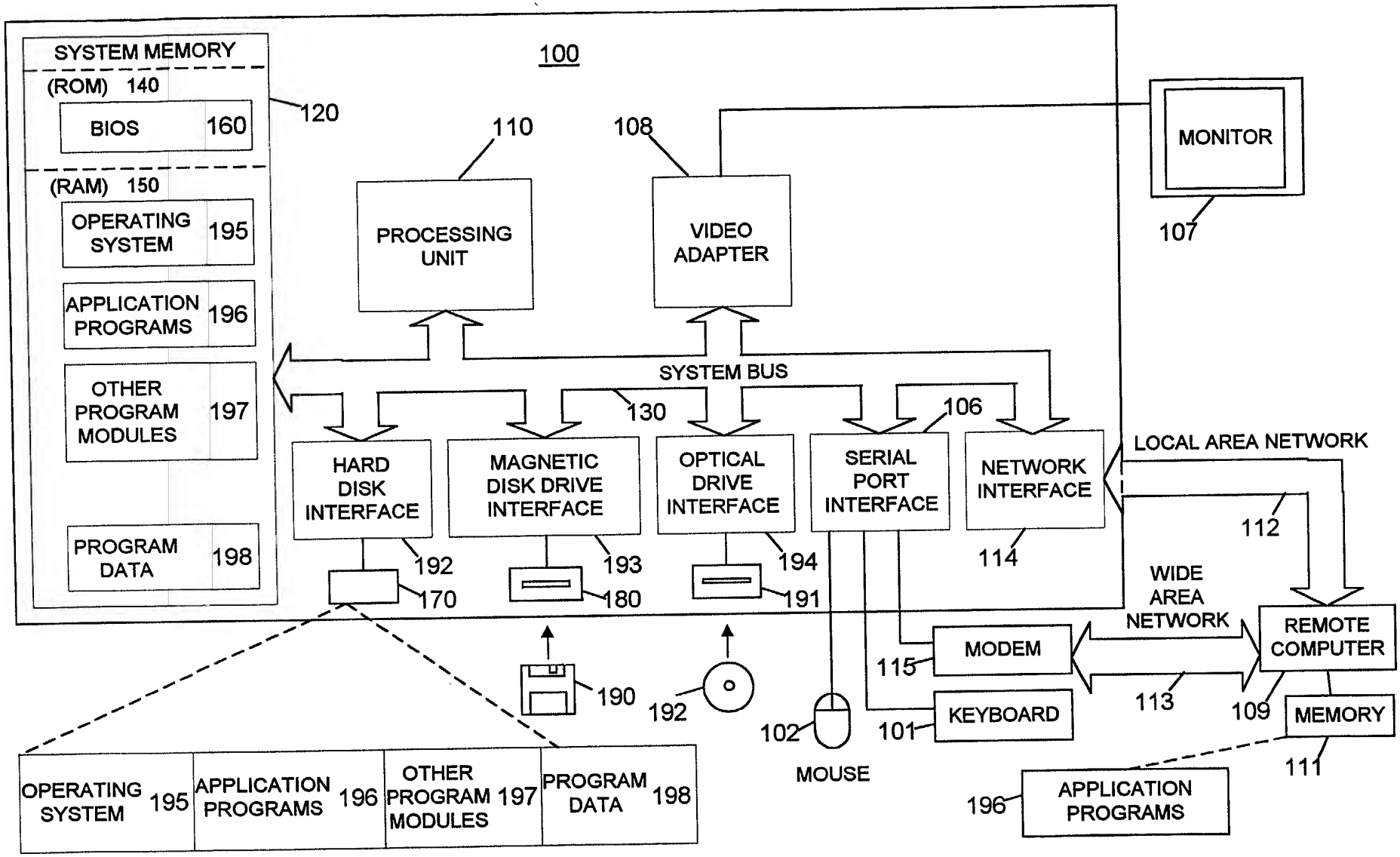

FIG. 1 (PRIOR ART)

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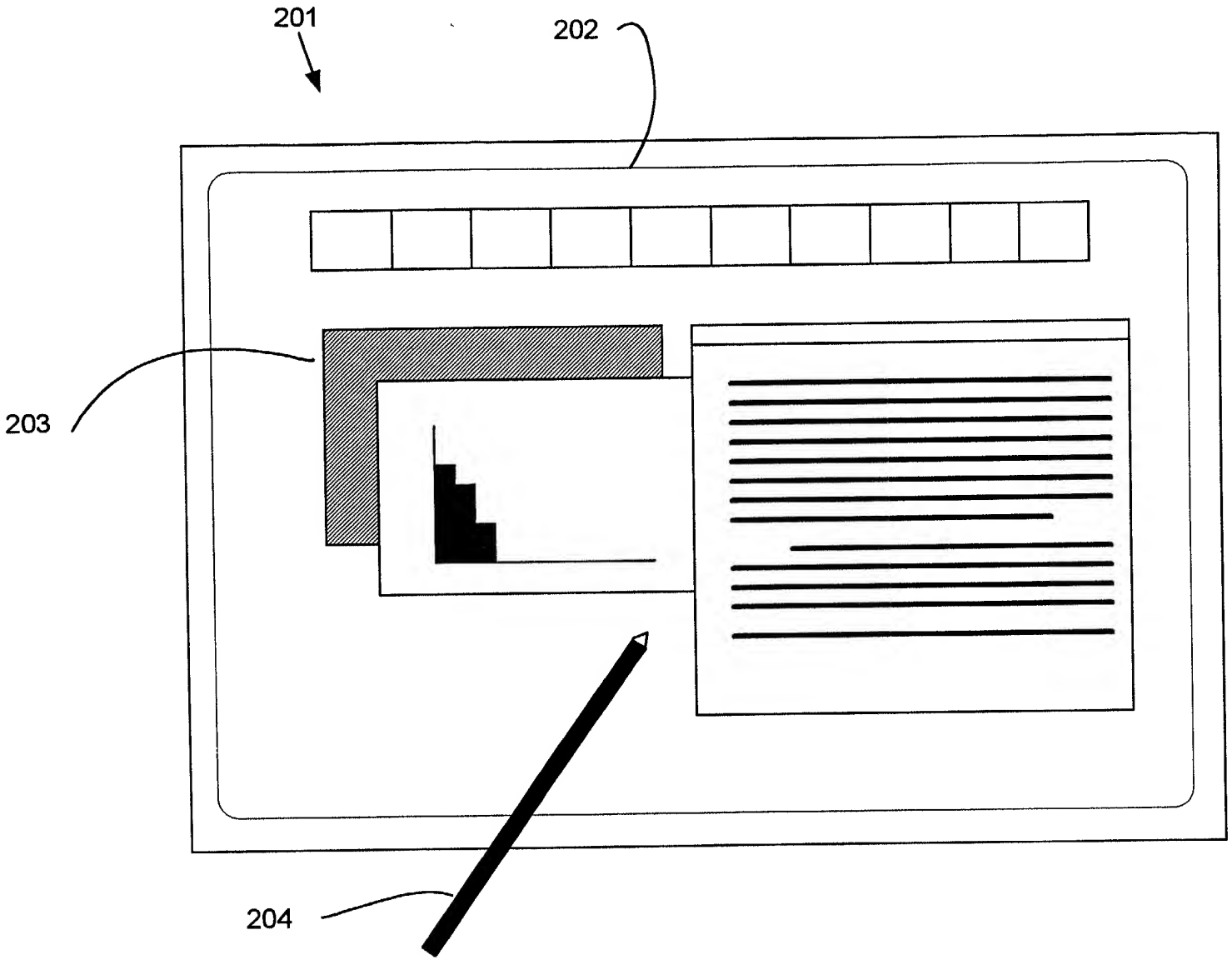


FIG. 2
(PRIOR ART)

09456805 .120799

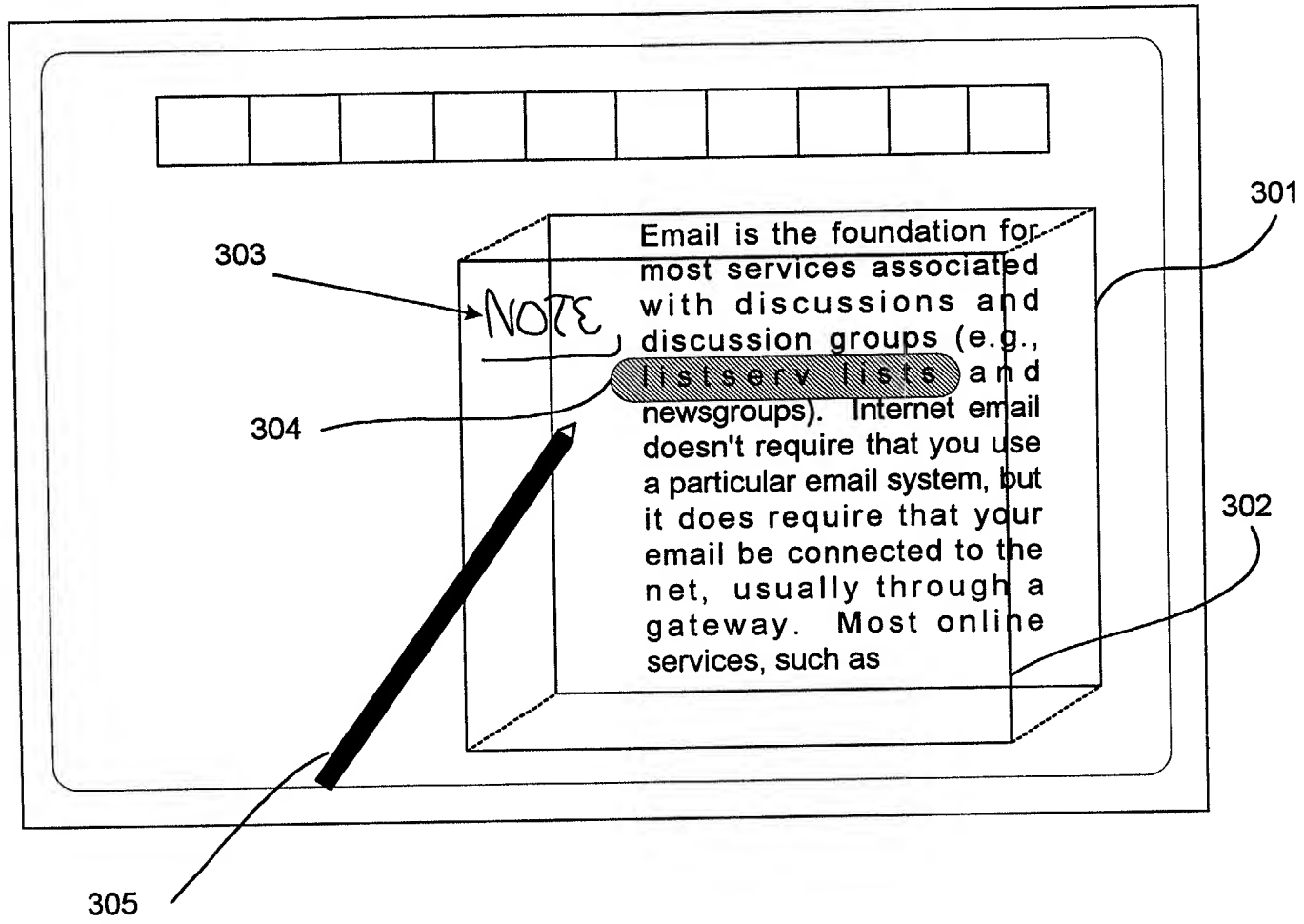

303
NOTE
304
Email is the foundation for most services associated with discussions and discussion groups (e.g., listserv lists and newsgroups). Internet email doesn't require that you use a particular email system, but it does require that your email be connected to the net, usually through a gateway. Most online services, such as
301
302
305

FIG. 3

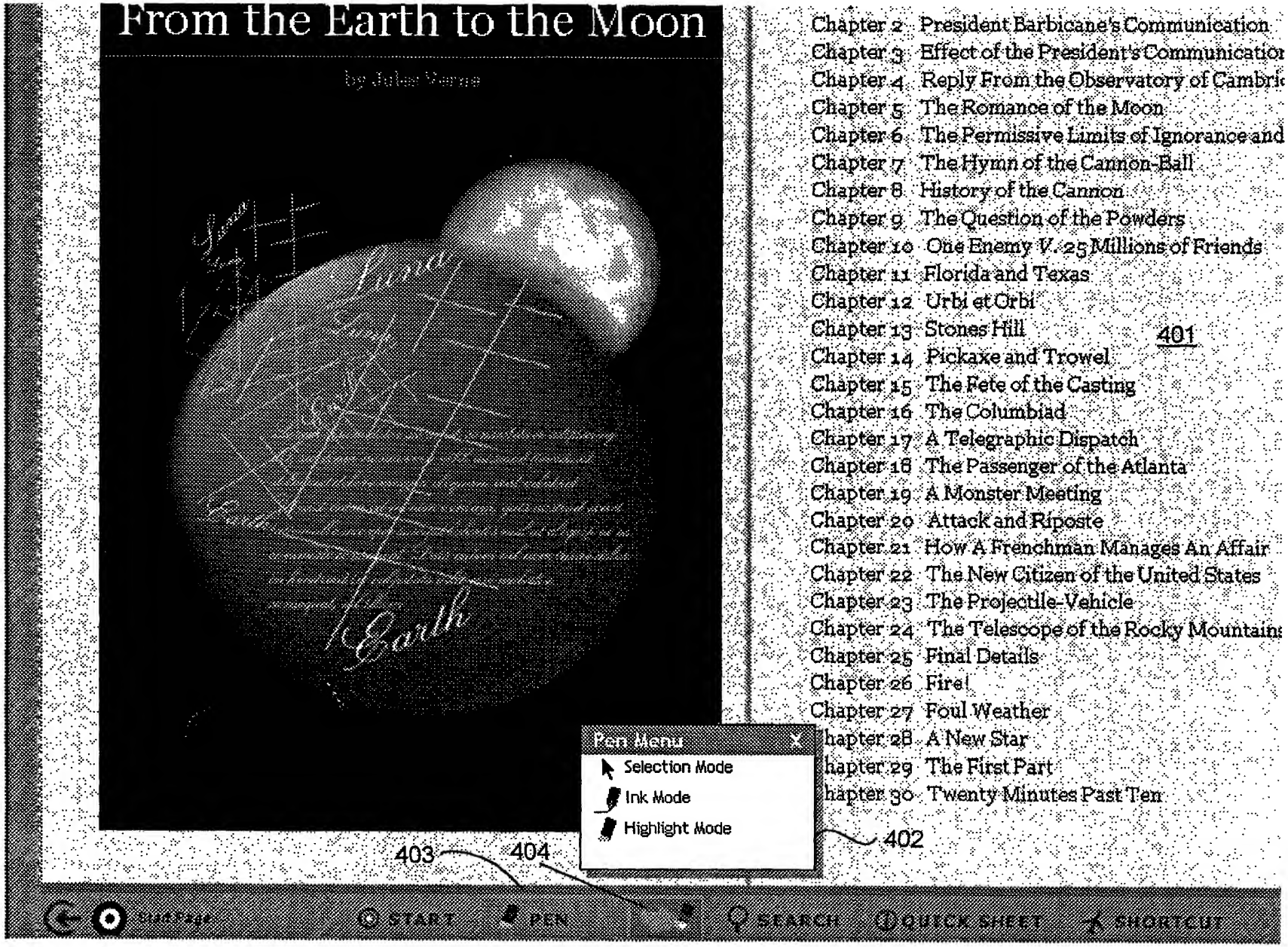
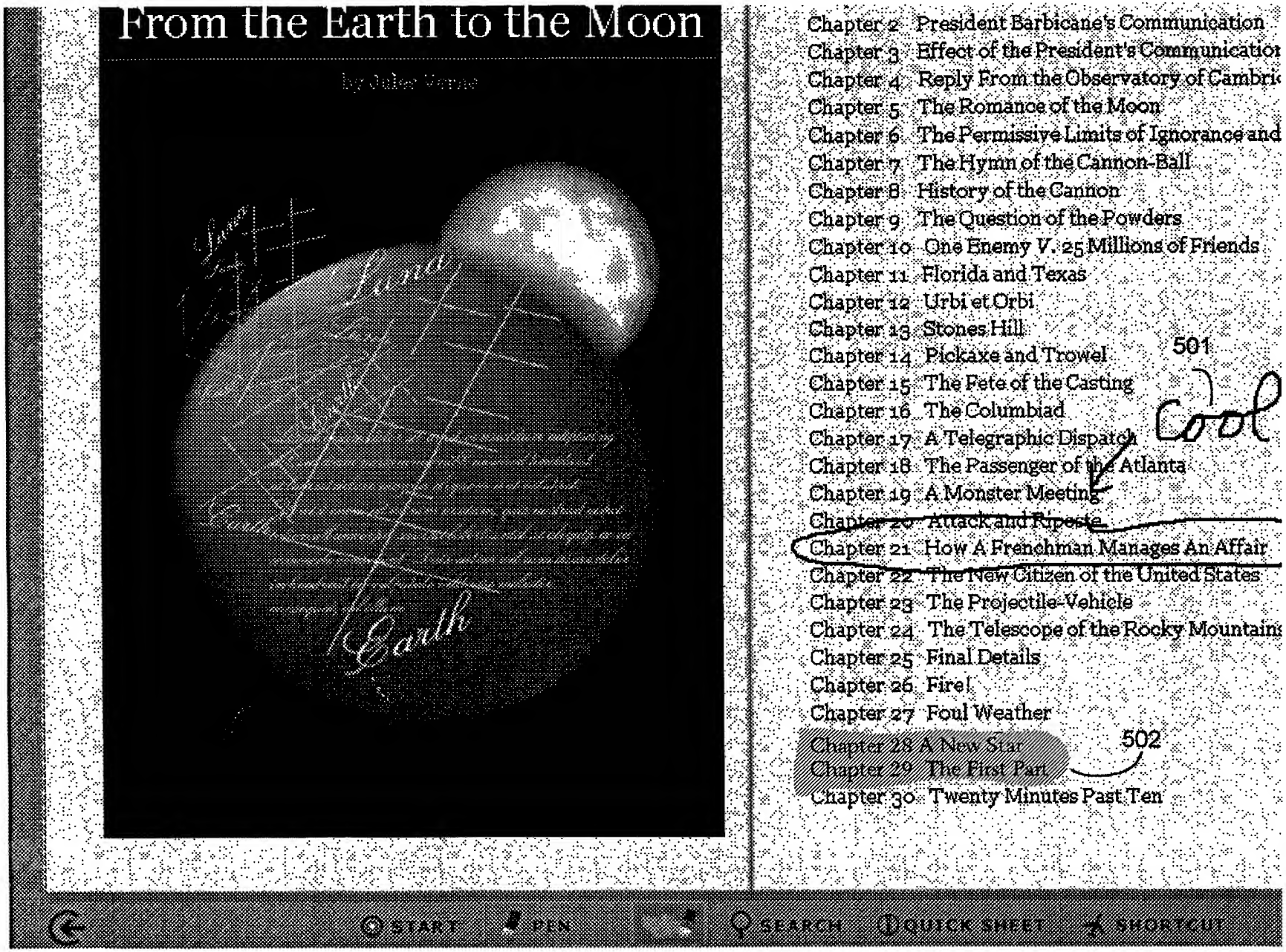

From the Earth to the Moon
by Jules Verne
Chapter 2 President Barbicane's Communication
Chapter 3 Effect of the President's Communicatio
Chapter 4 Reply From the Observatory of Cambri
Chapter 5 The Romance of the Moon
Chapter 6 The Permissive Limits of Ignorance and
Chapter 7 The Hymn of the Cannon-Ball
Chapter 8 History of the Cannon
Chapter 9 The Question of the Powders
Chapter 10 One Enemy V. 25 Millions of Friends
Chapter 11 Florida and Texas
Chapter 12 Urbi et Orbi
Chapter 13 Stones Hill
401
Chapter 14 Pickaxe and Trowel
Chapter 15 The Fete of the Casting
Chapter 16 The Columbiad
Chapter 17 A Telegraphic Dispatch
Chapter 18 The Passenger of the Atlanta
Chapter 19 A Monster Meeting
Chapter 20 Attack and Riposte
Chapter 21 How A Frenchman Manages An Affair
Chapter 22 The New Citizen of the United States
Chapter 23 The Projectile-Vehicle
Chapter 24 The Telescope of the Rocky Mountains
Chapter 25 Final Details
Chapter 26 Fire!
Chapter 27 Foul Weather
hapter 28 A New Star
hapter 29 The First Part
hapter 30 Twenty Minutes Past Ten
Pen Menu
Selection Mode
Ink Mode
Highlight Mode
402
403
404
START
PEN
SEARCH
QUICK SHEET
SHORTCUT

FIG. 4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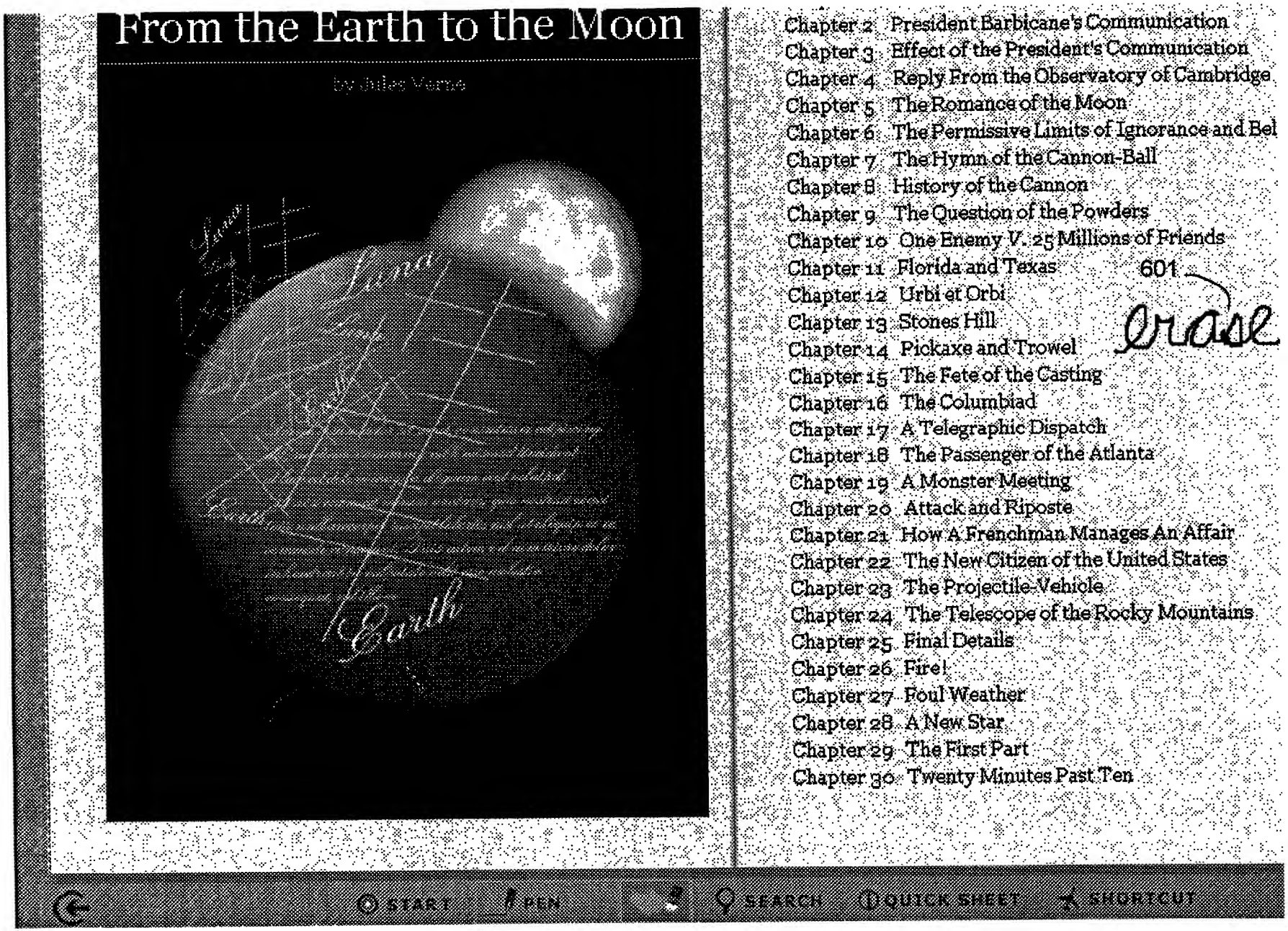
Chapter 23 The Projectile-Vehicle
Chapter 24 The Telescope of the Rocky Mountains
Chapter 25 Final Details
Chapter 26 Fire!
Chapter 27 Foul Weather
Chapter 28 A New Star
Chapter 29 The First Part
Chapter 30 Twenty Minutes Past Ten
501
Cool
502
START
PEN
SEARCH
QUICK SHEET
SHORTCUT

FIG. 5


From the Earth to the Moon
by Jules Verne
Earth
Chapter 2 President Barbicane's Communication
Chapter 3 Effect of the President's Communication
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Chapter 7 The Hymn of the Cannon-Ball
Chapter 8 History of the Cannon
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Chapter 10 One Enemy V. 25 Millions of Friends
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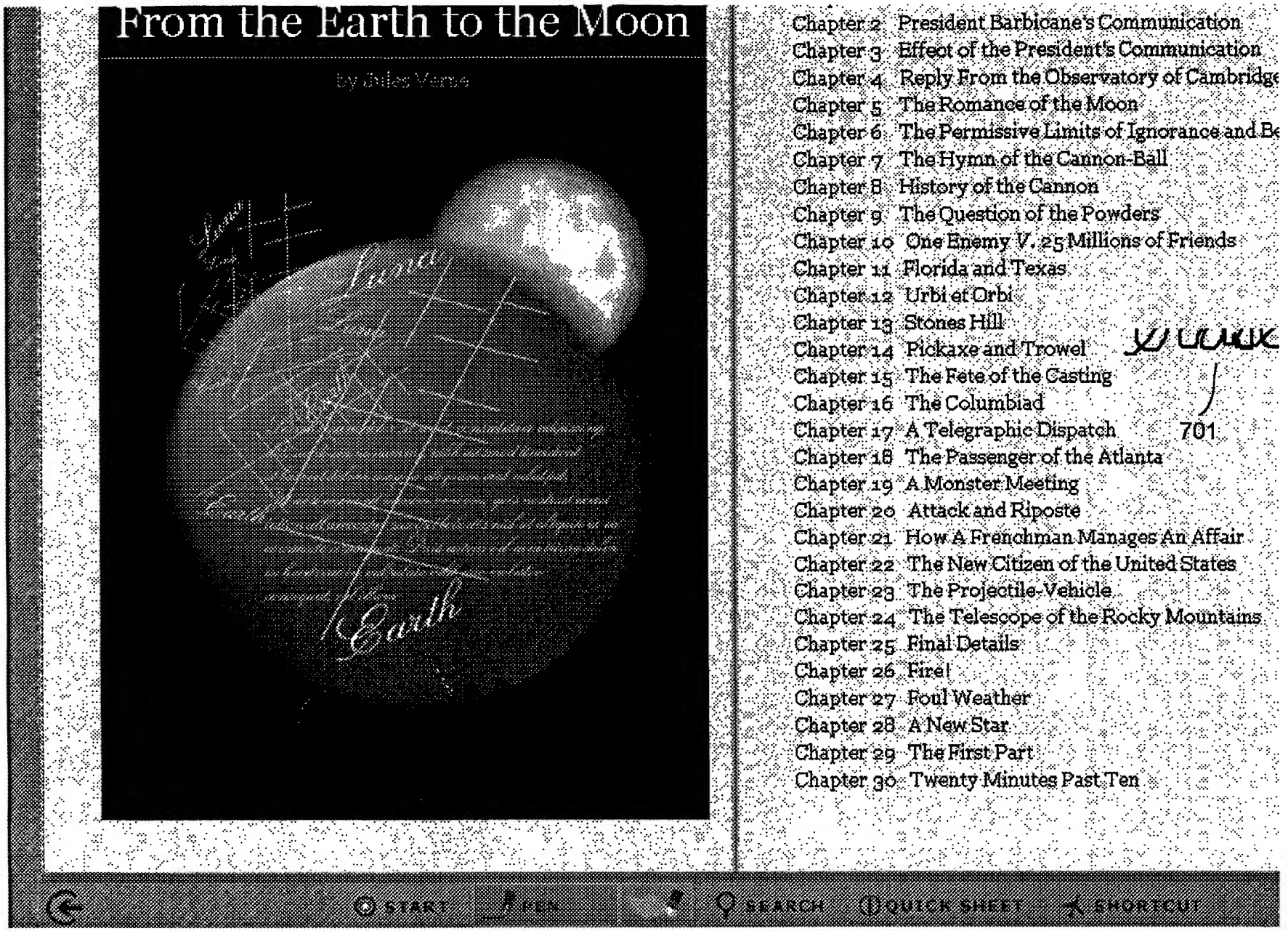
Chapter 23 The Projectile-Vehicle
Chapter 24 The Telescope of the Rocky Mountains
Chapter 25 Final Details
Chapter 26 Fire!
Chapter 27 Foul Weather
Chapter 28 A New Star
Chapter 29 The First Part
Chapter 30 Twenty Minutes Past Ten
Erase
START
PEN
SEARCH
QUICK SHEET
SHORTCUT

FIG. 6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Chapter 23 The Projectile-Vehicle
Chapter 24 The Telescope of the Rocky Mountains
Chapter 25 Final Details
Chapter 26 Fire!
Chapter 27 Foul Weather
Chapter 28 A New Star
Chapter 29 The First Part
Chapter 30 Twenty Minutes Past Ten
START
SEARCH
QUICK SHEET
SHORTCUT

FIG. 7

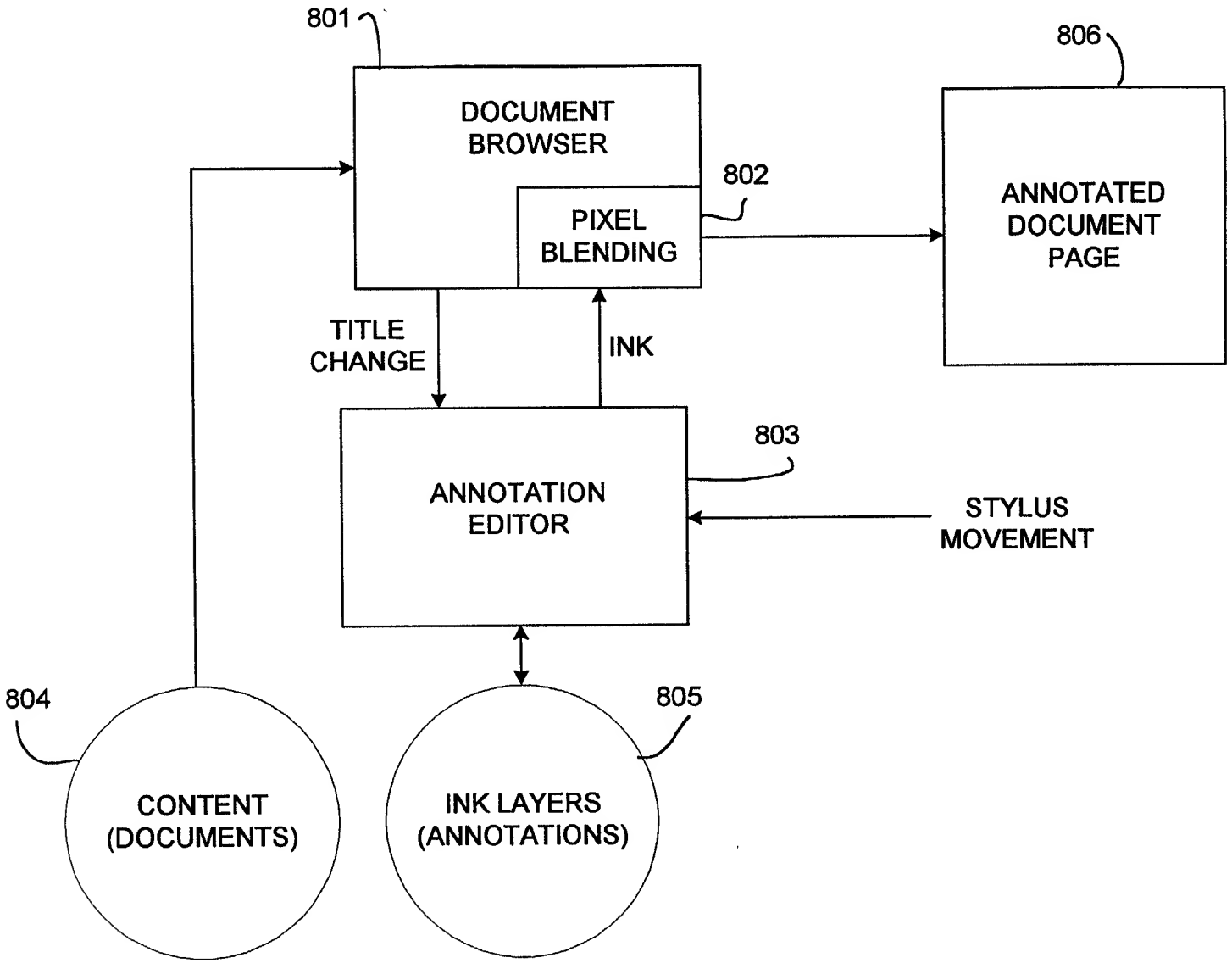
801
DOCUMENT BROWSER
802
PIXEL BLENDING
806
ANNOTATED DOCUMENT PAGE
TITLE CHANGE
INK
803
ANNOTATION EDITOR
STYLUS MOVEMENT
804
CONTENT (DOCUMENTS)
805
INK LAYERS (ANNOTATIONS)

FIG. 8

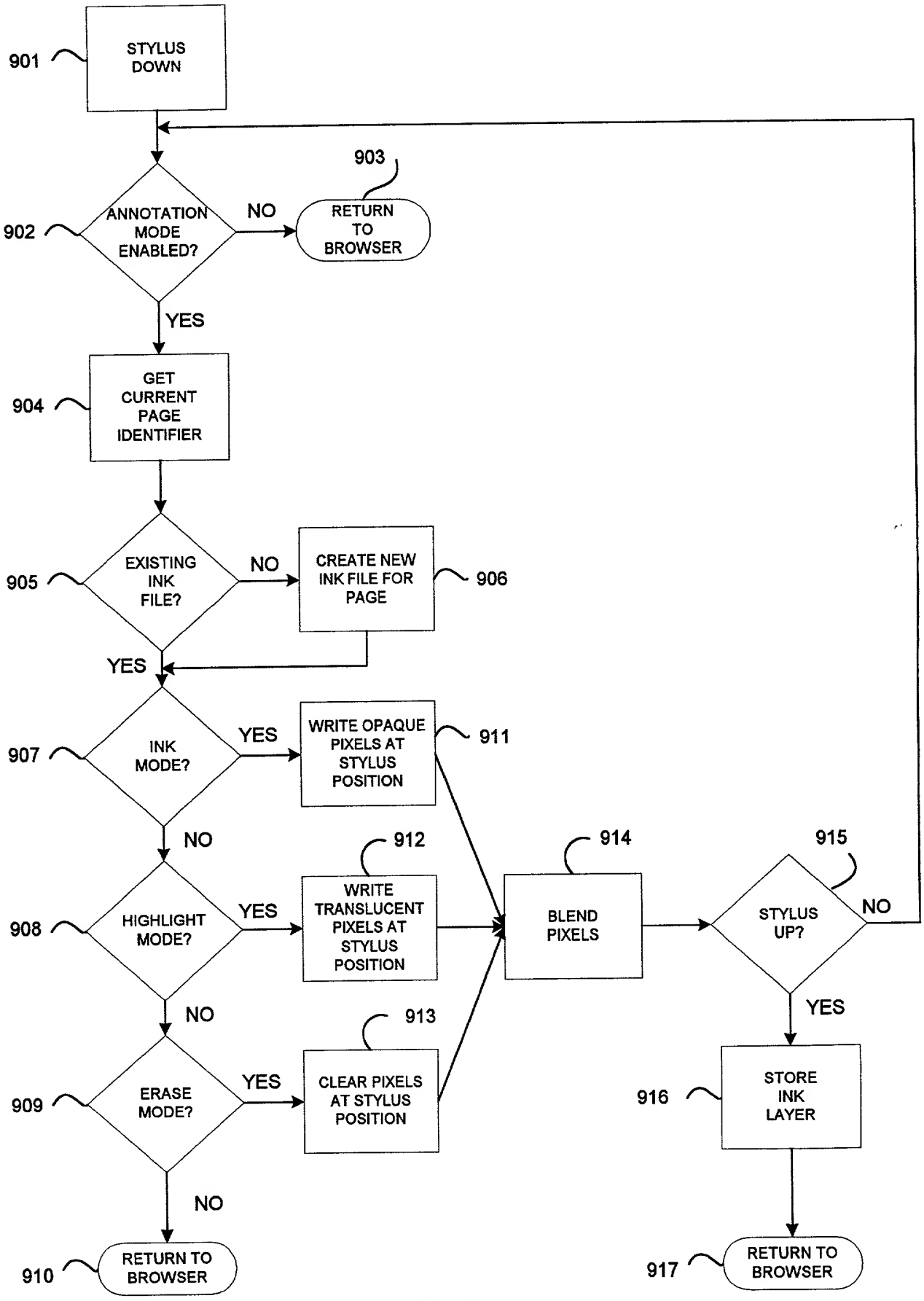
901
STYLUS DOWN
902
ANNOTATION MODE ENABLED?
NO
903
RETURN TO BROWSER
YES
904
GET CURRENT PAGE IDENTIFIER
905
EXISTING INK FILE?
NO
CREATE NEW INK FILE FOR PAGE
906
YES
907
INK MODE?
YES
WRITE OPAQUE PIXELS AT STYLUS POSITION
911
NO
908
HIGHLIGHT MODE?
YES
912
WRITE TRANSLUCENT PIXELS AT STYLUS POSITION
914
BLEND PIXELS
915
STYLUS UP?
NO
YES
NO
909
ERASE MODE?
YES
913
CLEAR PIXELS AT STYLUS POSITION
916
STORE INK LAYER
NO
910
RETURN TO BROWSER
917
RETURN TO BROWSER

FIG. 9A

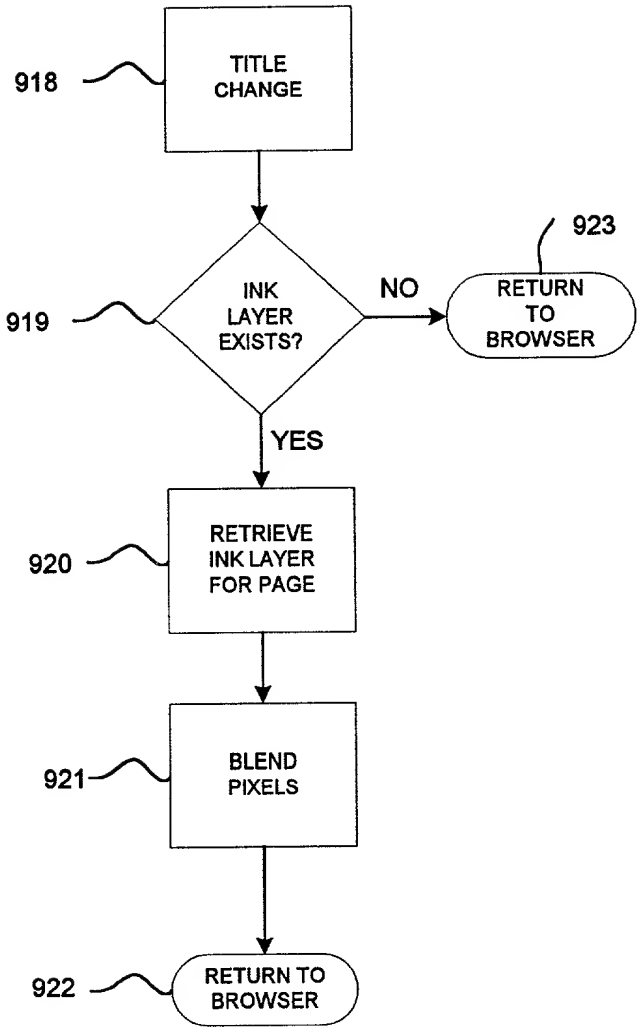
TITLE CHANGE
918
INK LAYER EXISTS?
919
NO
RETURN TO BROWSER
923
YES
RETRIEVE INK LAYER FOR PAGE
920
BLEND PIXELS
921
RETURN TO BROWSER
922

FIG. 9B

MS #125345.1
03797.78802

DECLARATION /POWER OF ATTORNEY FOR PATENT APPLICATION
JOINT INVENTORS

As the named inventors, we hereby declare:

Our residences, post office addresses and citizenships are as stated next to our names below:

We believe that we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled SYSTEM AND METHOD FOR ANNOTATING AN ELECTRONIC DOCUMENT INDEPENDENTLY OF ITS CONTENT, the specification of which

■ is attached hereto.
☐ was filed on _____ as application serial no. _____.

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulation, § 1.56.

Prior Foreign Applications

We hereby claim priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below. We have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is based.

Country	Application Number	Date of Filing (day, month, year)	Date of Issue (day, month, year)	Priority Claimed Under 35 U.S.C. § 119
				Yes ☐ No ☐
				Yes ☐ No ☐

Prior United States Application(s)

We hereby claim the benefit under Title 35 United States Code, § 120 of any United States patent application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, we acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulation, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial Number	Date of Filing (day, month, year)	Status — Patented, Pending, Abandoned

LAW OFFICES
BANNER & WITCOFF
1001 G STREET, N.W.
WASHINGTON, D.C. 20001-4597
(202) 508-9100

Power of Attorney

And we hereby appoint, both jointly and severally, as our attorneys with full power of substitution and revocation, to prosecute this application and transact all business in the U.S. Patent and Trademark Office connected herewith as well as before any office or agency of a foreign country or any international organization in connection with any foreign counterpart application claiming priority to this application, including the power to appoint agents and local representatives in connection with such foreign applications, the following attorneys of Banner & Witcoff, their registration numbers being listed after their names:

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Donald W. Banner	Reg. No. 17,037
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Christopher L. McKee	Reg. No. 32,384
Nina L. Medlock	Reg. No. 29,673
Timothy C. Meece	Reg. No. 38,553
Frederic M. Meeker	Reg. No. 35,282
Jon O. Nelson	Reg. No. 24,566
James A. Niegowski	Reg. No. 28,331
Thomas L. Peterson	Reg. No. 30,969
Joseph M. Potenza	Reg. No. 28,175
Thomas K. Pratt	Reg. No. 37,210
Christopher J. Renk	Reg. No. 33,761
Robert H. Resis	Reg. No. 32,168
Steven P. Schad	Reg. No. 32,550
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Charles W. Shifley	Reg. No. 28,042
Joseph M. Skerpon	Reg. No. 29,864
J. Pieter Van Es	Reg. No. 37,746
Kathleen M. Williams	Reg. No. 34,380
Susan A. Wolffe	Reg. No. 33,568
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Washington, D.C. 20001-4597
telephone number (202) 508-9100.

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information knowledge and belief are believed to be true; and further that these were made with the knowledge that false statements made willfully are punishable by fine, imprisonment, or both a fine and imprisonment under Section 1001 of Title 18 of the United States; and further that false statements made willfully may jeopardize the validity of any patent issuing on an application in which the false statements were made.

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Citizenship: U.S.

Post Office Address: 314 NW 60th, Seattle, WA 98107

Signature: _____ Date: September 3, 1999

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(202) 508-9100

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Signature _____ Date 9.3.1999

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Signature 9/3/99 _____ Date 9/3/99

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Signature _____ Date 9/3/99

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